

the code official prior to the issuance of any permit for construction in the V Zone.

#### SECTION 3108.0 RADIO AND TELEVISION TOWERS

■ Radio and television towers are special structures in that they are not normally occupied and they are open structures with little, if any, fuel load within. As such, this section provides specific provisions for radio and television towers that are designed to maintain the structural integrity of the tower and to minimize the potential for the tower to present a hazard (such as serving as a potential fire source because of inadequate grounding).

Since the towers are not normally occupied and do not typically contain a fuel load, the structure is exempt from other provisions of the code, except for the wind load provisions of Section 1609.0 and the combustibility restrictions of the supporting structures as required by Section 1510.0 (see Section 3108.1). The height and area limitations of Chapter 5 do not apply; instead, Section 3108.3 provides minimum construction criteria depending on the height of the tower. The structural integrity of the tower is basically governed by Section 3108.4.

**3108.1 General:** Subject to the structural provisions of Section 1609.0 for wind loads and the requirements of Section 1510.0 governing the fire resistance ratings of buildings for the support of roof structures, all radio and television towers shall be designed and constructed as herein provided.

■ Radio and television towers are to be constructed in accordance with the provisions of Section 3108.0; the wind load provisions of Section 1609.0 and the fire resistance ratings of the supporting structure, as governed by Section 1510.0. The provisions of Section 1609.0 minimize the potential for collapse of a tower as caused by forces associated with wind loads. The provisions of Section 1510.0 require the structure to be of noncombustible construction if the tower is 12 feet or more in height and the roof of the building is more than 40 feet in height (see commentary, Section 1510.0).

**3108.2 Location and access:** Towers shall be located and equipped with step bolts and ladders so as to provide ready access for inspection purposes. Guy wires or other accessories shall not cross or encroach upon any street or other public space or over any electric power lines, or encroach upon any other privately owned property without written consent of the owner.

■ Access must be provided to the tower so that the condition of the tower can be surveyed. Guy wires are to be arranged so as not to represent a hazard to the public and therefore, not cross or encroach a street, public space or electric power line. This is because of the damage that could occur if a guy wire were suddenly released, and also because of the need to prohibit the wire from becoming an obstruction. Guy wires are not to encroach on any other property without previous written consent by the owner of the affected property.

**3108.3 Construction:** All towers shall be constructed of approved corrosion resistant noncombustible material. The minimum type of construction of isolated radio towers not more than 100 feet (30480 mm) in height shall be Type 4.

■ Radio and television towers are required to be constructed of material that can withstand exposure to the environment and, therefore, be corrosion resistant. Whereas Section 1510.0 addresses the minimum allowable construction of towers that are roof structures, Section 3108.3 provides minimum construction requirements for all towers. Although most radio and television towers are constructed of noncombustible materials, towers that are isolated in accordance with Section 2304.7, and which are neither roof structures nor more than 100 feet in height, may be of Type 4 construction. The difficulty associated with igniting heavy timber construction and the physical separation of 20 feet reduces the fire hazard that a heavy timber tower may represent to adjacent structures.

**3108.4 Loads:** Towers shall be designed to resist wind loads in accordance with EIA/TIA 222-E listed in Chapter 3. Consideration shall be given to conditions involving wind loads on ice-covered sections in localities subject to sustained freezing temperatures.

■ To maintain structural integrity, radio and television towers must be designed to resist wind loads in accordance with Section 1609.0 and EIA/TIA 222-E, the referenced standard. EIA/TIA 222-E provides minimum load requirements for the design of buildings and other structures that are subject to the code requirements. In areas subject to freezing conditions, consideration must be given to the effects of wind loads on ice-covered towers.

**3108.4.1 Dead load:** Towers shall be designed for the dead load plus the ice load in regions where ice formation occurs.

■ To minimize the potential for collapse, a radio and television tower is to be designed to withstand the dead load of the structural elements of the tower, as well as the loads associated with a buildup of ice in areas subject to ice conditions.

**3108.4.2 Uplift:** Adequate foundations and anchorage shall be provided to resist two times the calculated wind uplift.

■ To include a factor of safety, the foundation and anchorage must be designed and constructed to withstand twice the calculated wind uplift so as to minimize the potential for overturning.

**3108.5 Grounding:** All towers shall be permanently and effectively grounded.

■ To minimize the potential for a fire resulting from lightning, radio and television towers are to be adequately grounded so that the electric charge is carried to the ground without affecting adjacent structures.

#### SECTION 3109.0 RADIO AND TELEVISION ANTENNAS

■ The minimum requirements for radio and television antennas are provided to verify that the installation does not reduce the protection provided by other sections of the code and to minimize the potential risk to adjacent structures. This section does not apply to antennas that are 12 feet or less in height (i.e., conventional television antennas that do not require any special knowledge or skill to erect safely and adequately). Furthermore,



weight and restricted size of such antennas would not require special structural design or support considerations.

**3109.1 Permits not required:** A building permit is not required for roof installation of antennal structures not more than 12 feet (3658 mm) in height for private radio or television reception. Such a structure shall not be erected so as to injure the roof covering, and when removed from the roof, the roof covering shall be repaired to maintain weather and water tightness. The installation of any antennal structure mounted on the roof of a building shall not be erected nearer to the lot line than the total height of the antennal structure above the roof, nor shall such structure be erected near electric power lines or encroach upon any street or other public space.

■ A permit is not required for roof-mounted radio and television antennas that are 12 feet or less in height. This height restriction applies to conventional roof-mounted antennas that do not require special structural design or support considerations.

To prevent damage to adjacent structures should the antenna collapse, antennas are not to be erected closer to the lot line than the height of the antenna. Therefore, if the antenna is 20 feet in height, the location of the antenna must be at least 20 feet from the nearest lot line. Adequate clearance is to be maintained between the antenna and the adjacent power lines, and the antenna cannot be an obstruction in a street or public space. Finally, the installation must not ignore the roof covering, as this may reduce the weather tightness and water tightness provided by the roof covering.

**3109.2 Permits required:** Approval shall be secured for all roof-mounted antennal structures more than 12 feet (3658 mm) in height above the roof. The application shall be accompanied by detailed drawings of the structure and methods of anchorage. All connections to the roof structure shall be properly flashed to maintain water tightness. The design and materials of construction shall comply with the requirements of Section 3108.3 for character, quality and minimum dimension.

■ Since antennas more than 12 feet in height may require special structural design or support considerations, a permit is required. Details of the proposed mounting and substantiation of the structural adequacy of the mounting, particularly as it relates to wind loading, are to be provided and reviewed by the code official. The connections to the roof structure must be such that the weather tightness and water tightness of the roof covering is maintained.

Whereas this section only applies to roof structures, the provisions of Section 1510.0 are, in most cases, to be applied in addition to Section 3108.3. The antennas are to be of an approved corrosion-resistant noncombustible material.

**3109.3 Dish antennas:** An antenna consisting of a radiation element which transmits or receives radiation signals generated by electrical light or sound energy and supported by a structure with or without a reflective component to the radiating dish, usually in a circular shape with a parabolic curve design constructed of a solid or open mesh surface, shall be known as a dish antenna.

■ Satellite dishes are heavier than conventional antennas and may have a solid surface area that would require wind load design considerations. Therefore, a permit is required for all satellite dishes that are more than 2 feet in diameter and that are erected on the roof of or are attached to any building or structure.

This section also defines what is meant by a dish antenna.

**3109.3.1 Permits:** The approval of the code official shall be secured for all dish antennal structures more than 2 feet (610 mm) in diameter erected on the roof of or attached to any building or structure. A permit is not required for dish antennas not more than 2 feet (610 mm) in diameter erected and maintained on the roof of any building.

■ A permit is required for any dish antenna that is erected on the roof of or is attached to any building or structure if it exceeds the indicated size. The primary consideration beyond that of any other antenna is the wind loading.

**3109.3.2 Structural provisions:** Dish antennas larger than 2 feet (610 mm) in diameter shall be subject to the structural provisions of Sections 1608.0, 1609.0 and 3108.4. The snow load provisions of Section 1608.0 shall not apply where the antenna has a heater to melt falling snow.

■ When a permit is required, the dish antenna must comply with the structural provisions of Sections 3108.4, 1608.0 and 1609.0. The provisions of EIA/TIA 222-E are to be used for evaluating the wind loads. If the dish antenna has a heater to melt snow, the concern for snow load is no longer relevant and the provisions of Section 1608.0 do not apply.

#### SECTION 3110.0 WINDOW-CLEANING SAFEGUARDS

■ A reality of the built environment is that buildings require maintenance, including the regular cleaning of windows. Since the effectiveness of windows as a source of natural light can be diminished by dirt buildup, the code anticipates the need to provide necessary hardware to accomplish cleaning.

**3110.1 General:** All buildings and structures over 50 feet (15240 mm) or four stories in height, in which the windows are cleaned from the outside, shall be provided with anchors, belt terminals or other approved safety devices for all window openings. Such devices shall be of an approved design and shall be constructed of corrosion-resistant materials securely attached to the window frames or anchored in the enclosure walls of the building. Cast iron or cast-bronze anchors shall be prohibited.

■ Because of the practical limitations of ladders and other devices used to reach windows located certain distances above grade, additional hardware is required on all windows to accommodate cleaning personnel. Cast-iron and cast-bronze anchors are specifically prohibited because of their propensity to become brittle with age.

The general language regarding the approval of proposed cleaning devices is to accommodate systems that may be required because of unusual building design characteristics. It is not uncommon for elaborate window-cleaning systems to be designed for buildings based on architectural considerations, such as projections, steep slopes, setbacks, etc.